REMARKS

Claims 1, 3-23 and 25-27 remain pending herein.

It is submitted that entry of the above amendments would be proper under 37 C.F.R. 1.116 since the amendments address an issue under 35 U.S.C.§112, first paragraph, which has previously been at issue in the present application. In particular, the amendments address the concern of the Examiner that the claims did not clearly define that the total cross-sectional area of all of the positive electrode tabs are not less than an area of 0.009 cm^2 for aluminum, 0.005 cm^2 for copper and 0.004 cm^2 for nickel, as well as similar recitation regarding the negative electrode tabs. In addition, claim 1 is amended to delete recitation on which a rejection under 35 U.S.C. 101 is allegedly based, thereby eliminating that issue. Also, claim 24 is cancelled hereby, thus obviating a claim objection. Accordingly, entry of the above amendments is respectfully requested.

Attached hereto as pages 11-15, pursuant to Rule 1.121(c)(1)(ii), is a marked-up version of the amended claims.

The April 18, 2002 Office Action includes statement that claim 24 would be objected to under 37 C.F.R. 1.75 when claim 23 is found to be allowable. In response, as noted above, claim 24 has been cancelled. Reconsideration and withdrawal of this planned objection are requested.

Claims 1, 3-6, 10, 12, 14, 16, 18, 20, 22-24 and 26 were rejected under 35 U.S.C.§101 and under 35 U.S.C.§112, first paragraph.

The Office Action includes a statement that "the claimed invention is of incredible utility" due to recitation that the respective tabs "do not fuse when at least 100A current flows through the lithium secondary battery...". In order to eliminate this rejection, the expression "so that the tabs connected to each of the positive and negative electrodes do not fuse when at least 100A current flows through the lithium secondary battery." As described in the present specification, by providing a battery in which the positive and negative electrode tabs satisfy the features recited in claim 1, under normal conditions experienced by a battery (e.g., temperature not greater than 100°C and pressure less than 10 atmosphere), the tabs will not fuse when at least 100A current flows through the battery. It is well known that whether or not a tab would fuse (under normal conditions) depends solely on the materials of the tab and the cross-sectional area of the tab; the length of the tab and the type of connections between the tab and the electrode have little effect on the heating of the tab. The expression "fuse" is used in the present

specification in accordance with its ordinary and well-known meaning, i.e., as a noun, an electrical safety device consisting of or including a wire or strip of fusible metal that melts and interrupts the circuit when the current exceeds a particular amperage; and as a verb, to interrupt a circuit as a result of such melting.

Claim 1 (and the claims dependent therefrom) was not rejected under any prior art of record in this application. It is submitted that no such prior art rejection would be proper, because none of the applied references contain disclosure which would motivate one of skill in the art to select materials and/or total cross-sectional areas for the positive and negative electrode tabs recited in claim 1, nor does any of the prior art disclose or suggest that doing so would provide a battery having tabs which do not fuse when at least 100A current flows therethrough.

Reconsideration and withdrawal of this rejection are requested.

Claims 1 and 3-6, 8-10, 12-14, 16, 18, 20 and 22-27 were rejected under 35 U.S.C.§112, first paragraph.

As noted above, the Office Action contains statements that claim 1 does not clearly indicate that the minimum cross-sectional areas for tabs of the three recited materials relate to the total cross-sectional area of all of the positive electrode tabs and, separately, all of the negative electrode tabs. In response, as indicated above, claims 1, 8, 12, 13, 22 and 25-27 have been amended to clarify that the minimum cross-sectional areas relate to the total of the positive electrode tabs and the total of the negative electrode tabs.

Reconsideration and withdrawal of this rejection are requested.

Claims 7-9, 11, 13, 15, 17, 19, 21, 25 and 27 were rejected under 35 U.S.C.§103(a) over Japanese 10-172,534 (JP '534) in view of U.S. Patent No. 6,099,986 (Gauthier '986).

JP '534 was published on June 26, 1998, i.e., after the filing date of Japanese 10-153,256, filed June 2, 1998, from which the present application claims priority. Submitted herewith is a Verified Translation of Japanese 10-153,256. The sworn translation indicates that Japanese 10-153,256 provides a written description of the subject matter recited in the rejected claims. Accordingly, it is respectfully submitted that at least the claims included in the present rejection are entitled to the priority date of June 2, 1998. In view of the Verified Translation of Japanese 10-153,256, JP '534 is removed as a prior art reference with respect to the present rejection. A certified copy of Japanese 10-153,256 was submitted to the U.S. PTO on June 19, 1999. Accordingly, reconsideration and withdrawal of this rejection are requested.

Claims 7, 11, 15, 17, 19 and 21 were rejected under 35 U.S.C.§103(a) over U.S. Patent No. 6,071,638 (Fradin '638) in view of Gauthier '986.

As has been previously pointed out, the applied references fail to disclose or suggest a lithium secondary battery which comprises at least a plurality of tabs to each of the positive and negative electrodes, wherein the tabs function as current fuses to become non-conductive in the event that a condition arises during discharge of the battery in which sufficient current to damage one or more components of the battery is provided.

The April 18, 2002 Office Action does not allege that the above-mentioned feature recited in claim 7 is disclosed in any of the applied references, and instead asserts that "apparatus claims cover what a device is, not what a device does", referring to Hewlett-Packard Co. v. Bausch & Lomb Inc. 909 F.2d 1464, 1469 (Fed. Cir. 1990) and asserts that "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus", referring to Ex parte Masham 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

The Applicants respectfully traverse the Examiner's position. It is long been recognized, and has been repeatedly and consistently held, that a patent applicant is free to recite features of apparatus either structurally or functionally. In re Schreiber, 44 USPQ2d 1429, 1432 (Fed. Cir. 1997), citing In re Swinehart, 439 F.2d 210, 212 (CCPA 1971)("[T]here is nothing intrinsically wrong with [defining something by what it does rather than what it is] in drafting patent claims.").

Hewlett-Packard, cited in the Office Action, held that a claim to an apparatus was valid over the prior art, and rejected an argument by the defendant that the patentee should be required to demonstrate that the infringing article function in a manner similar to the way that the claimed device functions. Masham, also cited in the Office Action, held that *a recitation with respect to the material intended to be worked upon by a claimed apparatus* does not impose any structural limitations upon the claimed apparatus, and that recitation *with respect to the manner in which a claimed apparatus is intended to be employed* does not differentiate the claimed apparatus from a prior art apparatus.

The expression "wherein the tabs function as current fuses to become non-conductive in the event that a condition arises during discharge of the battery in which sufficient current to

damage one or more components of the battery is provided" is a structural element, because it limits the scope of devices which fall within the literal language of the claim. This language is also not indefinite, because the claim recites a battery, and those of skill in the art could readily test a battery in order to determine whether current sufficient to damage one or more components of the battery cause the tabs of the battery to fuse. This claim recitation is analogous to, e.g., reciting that an element is formed of a material having a melting point not greater than a particular temperature, i.e., indicating that a particular phenomenon will occur if a particular condition is applied to the element.

Accordingly, the feature recited in the last paragraph of claim 7 must be considered by the U.S. PTO.

As has been previously noted, in all lithium secondary batteries in the prior art, the batteries do not provide sufficient current to cause the tabs within the battery to fuse. That is, even if a short circuit condition arises, known lithium secondary batteries will run out of capacity long before any of the tabs therein melt or otherwise produce a fusing function. The invention recited in claim 7 provides a novel and unobvious approach by dimensioning tabs such that a short circuit condition during discharge of the battery can give rise to a current at which the tabs will perform a fusing function.

Since the applied references fail to disclose or suggest that feature, the subject matter of claim 7 is allowable over the applied references.

Reconsideration and withdrawal of this rejection are requested.

Claims 8, 9, 13, 25 and 27 were rejected under 35 U.S.C.§103(a) over Fradin '638 in view of Gauthier '986 and Fishbane et al. "Physics for Scientists and Engineers." Fishbane is cited for disclosure of a problem in which a bus bar made of copper, of resistivity 1.72×10^{-8} $\Omega \cdot m$, is meant to carry 100 A over a distance of 0.25 m at a temperature of 300°C, and asks what is the minimum cross section of the bus bar if no more than 0.2 W of power is to be dissipated? Such disclosure in Fishbane would not have motivated one of skill in the art to modify Fradin '638 or Gauthier '986 so as to provide tabs which function as current fuses as recited in the last paragraph of claim 7, from which each of claims 8, 9, 13, 25 and 27 each ultimately depend.

Reconsideration and withdrawal of this rejection are requested.

In view of the above, claims 1, 3-23 and 25-27 are in condition for allowance.

If the Examiner believes that contact with Applicant's attorney would be advantageous toward the disposition of this case, the Examiner is herein requested to call Applicant's attorney at the phone number noted below.

The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 50-1446.

Respectfully submitted,

August 19, 2002
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VERSION OF CLAIMS WITH MARKINGS TO SHOW CHANGES MADE

1. (Amended Four Times) A lithium secondary battery, comprising:

an internal electrode body including a positive electrode, a negative electrode, and a separator, the positive electrode and the negative electrode being wound or laminated with the separator so that the positive electrode and the negative electrode are prevented by the separator from coming into direct contact with each other;

an organic electrolyte; and

~~at least a plurality of tabs connected to each of the positive and negative electrodes for current collecting, each of the tabs having a total cross-sectional area not less than a constant area in accordance with the quality of the material to be used for the tabs so that the tabs connected to each of the positive and negative electrodes do not fuse when at least 100 A current flows through the lithium secondary battery, each of said tabs being selected from among aluminum tabs each having a total cross-sectional area of not less than 0.009 cm^2, copper tabs each having a total cross-sectional area of not less than 0.005 cm^2 and nickel tabs each having a total cross-sectional area of not less than 0.004 cm^2.~~ at least a plurality of positive electrode tabs connected to the positive electrode and at least a plurality of negative electrode tabs connected to the negative electrode for current collecting,

a total cross-sectional area of all of the positive electrode tabs connected to the positive electrode being not less than a constant area in accordance with the quality of the material to be used for the tabs, said tabs connected to the positive electrode being selected from among aluminum tabs wherein a total cross-sectional area of all of said tabs connected to the positive electrode is not less than 0.009 cm^2, copper tabs wherein a total cross-sectional area of all of said tabs connected to the positive electrode is not less than 0.005 cm^2 and nickel tabs wherein a total cross-sectional area of all of said tabs connected to the positive electrode is not less than 0.004 cm^2;

a total cross-sectional area of all of the negative electrode tabs connected to the negative electrode being not less than a constant area in accordance with the quality of the material to be used for the tabs, said tabs connected to the negative electrode being selected from among aluminum tabs wherein a total cross-sectional area of all of said tabs connected to the negative electrode is not less than 0.009 cm^2, copper tabs wherein a total

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cross-sectional area of all of said tabs connected to the negative electrode is not less than 0.005 cm^2 and nickel tabs wherein a total cross-sectional area of all of said tabs connected to the negative electrode is not less than 0.004 cm^2.

8. (Thrice Amended) The lithium secondary battery according to claim 7, wherein said tabs connected to the positive electrode are selected from among aluminum tabs ~~each having~~ wherein a total cross-sectional area of all of said tabs connected to the positive electrode is not more than 0.36/R (cm^2), R being internal resistance, in mΩ, of a unit battery, copper tabs ~~each having~~ wherein a total cross-sectional area of all of said tabs connected to the positive electrode is not more than 0.18/R cm^2, and nickel tabs ~~each having~~ wherein a total cross-sectional area of all of said tabs connected to the positive electrode is not more than 0.14/R cm^2 and wherein said tabs connected to the negative electrode are selected from among aluminum tabs wherein a total cross-sectional area of all of said tabs connected to the negative electrode is not more than 0.36/R (cm^2), copper tabs wherein a total cross-sectional area of all of said tabs connected to the negative electrode is not more than 0.18/R cm^2, and nickel tabs wherein a total cross-sectional area of all of said tabs connected to the negative electrode is not more than 0.14/R cm^2.

12. (Thrice Amended) The lithium secondary battery according to claim 1, wherein said tabs connected to the positive electrode are selected from among aluminum tabs ~~each having~~ wherein a total cross-sectional area of all of said tabs connected to the positive electrode is not less than 0.008 cm^2 and not more than 0.36/R (cm^2), R being internal resistance, in mΩ, of a unit battery, copper tabs ~~each having~~ wherein a total cross-sectional area of all of said tabs connected to the positive electrode is not less than 0.005 cm^2 and not more than 0.18/R cm^2, and nickel tabs ~~each having~~ wherein a total cross-sectional area of all of said tabs connected to the positive electrode is not less than 0.004 cm^2 and not more than 0.14/R cm^2 and wherein said tabs connected to the negative electrode are selected from among aluminum tabs wherein a total cross-sectional area of all of said tabs connected to the negative electrode is not less than 0.008 cm^2 and not more than 0.36/R (cm^2), copper tabs wherein a total cross-sectional area of all of said tabs

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connected to the negative electrode is not less than 0.005 cm^2 and not more than 0.18/R cm^2, and nickel tabs wherein a total cross-sectional area of all of said tabs connected to the negative electrode is not less than 0.004 cm^2 and not more than 0.14/R cm^2.

13. (Thrice Amended) The lithium secondary battery according to claim 7, wherein said tabs connected to the positive electrode are selected from among aluminum tabs ~~each having~~ wherein a total cross-sectional area all of said tabs connected to the positive electrode is ~~of~~ not less than 0.008 cm^2 and not more than 0.36/R (cm^2), R being internal resistance, in mΩ, of a unit battery, copper tabs ~~each having~~ wherein a total cross-sectional area of all of said tabs connected to the positive electrode is not less than 0.005 cm^2 and not more than 0.18/R cm^2, and nickel tabs ~~each having~~ wherein a total cross-sectional area of all of said tabs connected to the positive electrode is not less than 0.004 cm^2 and not more than 0.14/R cm^2 and wherein said tabs connected to the negative electrode are selected from among aluminum tabs wherein a total cross-sectional area of all of said tabs connected to the negative electrode is not less than 0.008 cm^2 and not more than 0.36/R (cm^2), copper tabs wherein a total cross-sectional area of all of said tabs connected to the negative electrode is not less than 0.005 cm^2 and not more than 0.18/R cm^2, and nickel tabs wherein a total cross-sectional area of all of said tabs connected to the negative electrode is not less than 0.004 cm^2 and not more than 0.14/R cm^2.

22. (Twice Amended) The lithium secondary battery according to claim 1, wherein said tabs connected to the positive electrode are selected from among aluminum tabs ~~each having~~ wherein a total cross-sectional area of all of said tabs connected to the positive electrode is not less than 0.014 cm^2, copper tabs ~~each having~~ wherein a total cross-sectional area of all of said tabs connected to the positive electrode is not less than 0.008 cm^2 and nickel tabs ~~each having~~ wherein a total cross-sectional area of all of said tabs connected to the positive electrode is not less than 0.008 cm^2 and wherein said tabs connected to the negative electrode are selected from among aluminum tabs wherein a total cross-sectional area of all of said tabs connected to the negative electrode is not less than 0.014 cm^2, copper tabs wherein a total cross-sectional area of all of said tabs

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connected to the negative electrode is not less than 0.008 cm^2, and nickel tabs wherein a total cross-sectional area of all of said tabs connected to the negative electrode is not less than 0.008 cm^2.

25. (Twice Amended) The lithium secondary battery according to claim 7, wherein said tabs connected to the positive electrode are selected from among aluminum tabs ~~each having~~ wherein a total cross-sectional area of all of said tabs connected to the positive electrode is not more than 0.18/R (cm^2), R being internal resistance, in mΩ, of a unit battery, copper tabs ~~each having~~ wherein a total cross-sectional area of all of said tabs connected to the positive electrode is not more than 0.09/R cm^2, and nickel tabs ~~each having~~ wherein a total cross-sectional area of all of said tabs connected to the positive electrode is not more than 0.07/R cm^2 and wherein said tabs connected to the negative electrode are selected from among aluminum tabs wherein a total cross-sectional area of all of said tabs connected to the negative electrode is not more than 0.18/R (cm^2), copper tabs wherein a total cross-sectional area of all of said tabs connected to the negative electrode is not more than 0.09/R cm^2, and nickel tabs wherein a total cross-sectional area of all of said tabs connected to the negative electrode is not more than 0.07/R cm^2.

26. (Twice Amended) The lithium secondary battery according to claim 1, wherein said tabs connected to the positive electrode are selected from among aluminum tabs ~~each having~~ wherein a total cross-sectional area of all of said tabs connected to the positive electrode is not less than 0.014 cm^2 and not more than 0.18/R (cm^2), R being internal resistance, in mΩ, of a unit battery, copper tabs ~~each having~~ wherein a total cross-sectional area of all of said tabs connected to the positive electrode is not less than 0.008 cm^2 and not more than 0.09/R cm^2, and nickel tabs ~~each having~~ wherein a total cross-sectional area of all of said tabs connected to the positive electrode is not less than 0.008 cm^2 and not more than 0.07/R cm^2 and wherein said tabs connected to the negative electrode are selected from among aluminum tabs wherein a total cross-sectional area of all of said tabs connected to the negative electrode is not less than 0.014 cm^2 and not more than 0.18/R (cm^2), copper tabs wherein a total cross-sectional area of all of said tabs

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connected to the negative electrode is not less than 0.008 cm^2 and not more than 0.09/R cm^2, and nickel tabs wherein a total cross-sectional area of all of said tabs connected to the negative electrode is not less than 0.008 cm^2 and not more than 0.07/R cm^2.

27. (Twice Amended) The lithium secondary battery according to claim 7, wherein said tabs connected to the positive electrode are selected from among aluminum tabs ~~each having~~ wherein a total cross-sectional area of all of said tabs connected to the positive electrode is not less than 0.014 cm^2 and not more than 0.18/R (cm^2), R being internal resistance, in mΩ of a unit battery, copper tabs ~~each having~~ wherein a total cross-sectional area of all of said tabs connected to the positive electrode is not less than 0.008 cm^2 and not more than 0.09/R cm^2, and nickel tabs ~~each having~~ wherein a total cross-sectional area of all of said tabs connected to the positive electrode is not less than 0.008 cm^2 and not more than 0.07/R cm^2 and wherein said tabs connected to the negative electrode are selected from among aluminum tabs wherein a total cross-sectional area of all of said tabs connected to the negative electrode is not less than 0.014 cm^2 and not more than 0.18/R (cm^2), copper tabs wherein a total cross-sectional area of all of said tabs connected to the negative electrode is not less than 0.008 cm^2 and not more than 0.09/R cm^2, and nickel tabs wherein a total cross-sectional area of all of said tabs connected to the negative electrode is not less than 0.008 cm^2 and not more than 0.07/R cm^2.